

Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) EP 0 800 011 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.10.1997 Bulletin 1997/41

(51) Int. Cl.⁶: F16C 35/077

(21) Application number: 97105057.0

(22) Date of filing: 25.03.1997

(84) Designated Contracting States:
DE FR GB SE

(30) Priority: 26.03.1996 IT TO960233

(71) Applicant: SKF INDUSTRIE S.p.A.
I-10128 Torino (IT)

(72) Inventors:
• Vignotto, Angelo
10100 Torino (IT)

• Ruetter, Andreas
10064 Pinerolo (IT)
• Pons, Luciano
10064 Pinerolo (IT)

(74) Representative: Plebani, Rinaldo et al
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(54) Protective element against electrolytic corrosion, particularly for the strut of a vehicle and its bearing

(57) In order to protect a junction between mechanical parts made from different metals from electrolytic corrosion, there is interposed between the parts a protective shield which is formed from sheet metal, generally steel, the surface of which is treated to render it electrically passive; more particularly, in the motor-vehicle field, the connection between the flange of a wheel bearing and the respective strut or between the flange and the end of a shock absorber or of a disc brake may be the seat of electrolytic corrosion; such corrosion is caused by electrovoltaic potentials generated in the zone of contact between different metals in the presence of moisture; the protective shield may also cover the side of the outer ring of the bearing and cooperate with the seal as an additional labyrinthine sealing element.

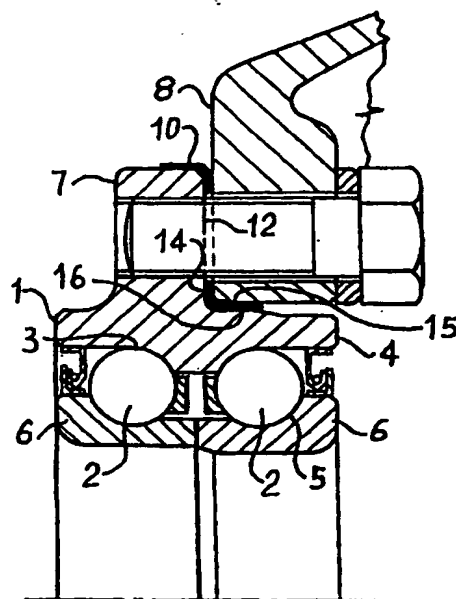


FIG. 1

EP 0 800 011 A2

Description

The present invention relates to a corrosion-protective element for protecting junctions between metal parts against electrolytic corrosion, particularly for a coupling between a bearing and a strut of a motor vehicle.

It is known that at junctions between parts, or mechanical components, made from different metals connected together in direct contact, electrical potential differences are set up between the parts through an electrochemical effect (voltaic effect) and, in time, cause oxidation at the zone of contact, commonly called electrolytic corrosion; this action is greatly enhanced by the presence of moisture.

Various measures are therefore used to limit or prevent such phenomena from arising; one such measure consists of varnishing the facing parts with special varnishes which are electrically insulating and non-electrostatic; this solution does not give good results, especially in the case of metal parts which are firmly clamped against each other and subject to continuous vibration since the varnish in the clamped region wears thin and, in time, cracks so as to allow moisture from the environment to reach the metals.

Another well known measure is to interpose a sheet of electrically insulating material (washer), constituted by a paste of natural or artificial fibres with a synthetic binder, between the parts connected; this solution is not suitable for very strong connections between mechanical components which are subject to considerable stress, such as vibrations in all directions, and which must be clamped very tightly together, since the material of the inserted washer normally has a limited rigidity whereby the coupling can slacken in time.

The object of the present invention is therefore to provide protection against electrolytic corrosion at junctions between metal parts, particularly for a coupling between a bearing and a strut of a motor vehicle, which is free from the problems encountered in similar devices and ensures effective and long-lasting protection even in onerous working conditions.

In accordance with the purpose indicated, there is provided an innovative protective element for protecting junctions between metal parts against electrolytic corrosion, particularly for a coupling between a wheel bearing of a motor vehicle and the corresponding strut, the bearing including a fixed outer ring with an attachment flange for connecting the bearing to the strut, the protective element being characterised in that it is constituted by a shield of sheet metal which is electrically passivated or at least has an anti-corrosive coating on opposite surfaces, shaped so as to fit closely over a contact surface of one of the metal parts to keep the parts separated from each other.

These and other characteristics of the invention will become more apparent from the following description of a preferred embodiment, given by way of non-limitative example, with reference to the appended drawings, in

which:

Figure 1 is a radial section through a bearing for a motor-vehicle wheel provided with a corrosion-protective element according to the invention;

Figure 2 shows a detail of Figure 1 on an enlarged scale;

Figure 3 shows a different embodiment of the detail of Figure 2.

With reference to the drawings, a rolling bearing commonly used in the motor-vehicle field as a support for the drive wheels is shown indicated 1; in this specific case, the bearing 1 comprises a double ring of rolling bodies 2 which roll in tracks 3, both formed in a single outer ring 4, and in tracks 5 formed in two inner rings 6 formed separately to facilitate assembly; the outer ring 4 is fixed and has a flange 7 for connecting the bearing 1 to a strut 8 of the vehicle, part of which is shown in section for simplicity; the inner rings 6 are keyed to a spindle of a constant-velocity coupling not shown.

Since the materials constituting the outer ring 4 and the strut 8 are generally different, the facing surfaces of the bearing and of the strut in the region of contact tend to oxidise as a result of an electrochemical reaction due to an electrical potential difference, of a voltaic nature, set up between the different metal components; in the presence of moisture this surface oxidation changes to corrosion of the metal in depth and rapidly leads to the formation of rust which in time may cause slackening of the coupling between the outer ring 4 and the strut 8 as well as functional degradation of the members involved in the corrosion.

In accordance with the present invention, in order to prevent the formation of oxides and/or corrosion of the parts in metal-to-metal contact, the outer ring 4 is covered by a protective shield 10 formed from blanked and folded sheet metal, which has been treated, for example passivated, or at least covered by an anti-corrosive coating so as to render its outer surfaces electrically passive; preferably the outer surfaces of the shield 10 are aluminised.

The protective shield 10 is shaped so that it is a perfect, close fit over the metal of the outer ring 4 itself; in the embodiment of Figure 1, the shield 10 is limited so as to cover only the surface of the flange 7 intended to mate with a cooperating surface of the strut 8; in this case the shield 10 is constituted by a radially-extending, flat annular portion 12 which covers a lateral face 14 of the flange 7; the portion 12 is joined to an axially-extending cylindrical portion 15, bent at 90° thereto, which is adapted to be superimposed on a corresponding cylindrical zone 16 of the ring 4 so as to constitute a radial seat for the strut 8.

In order to increase the degree of protection, the shield 10 is extended beyond the zone of contact between the ring and the strut to neighbouring regions (Figure 2), specifically covering the outer face 17 of the flange 7 and the axially-facing edge 18 of the ring 4.

The shield 10 is wrapped over the edge 18 and extends into the annular space 19 between the two rings 4 and 6, where the shield 10 is sealed by co-moulding to a resilient sealing ring 20, of a type with sliding lips, with or without a spring.

5

Figure 3 shows a different position of the inner edge 21 of the shield 10 which participates in the main sealing provided by the resilient ring 20 as a flat radial shield, terminating at a short distance from the inner ring 6 to form a labyrinthine seal.

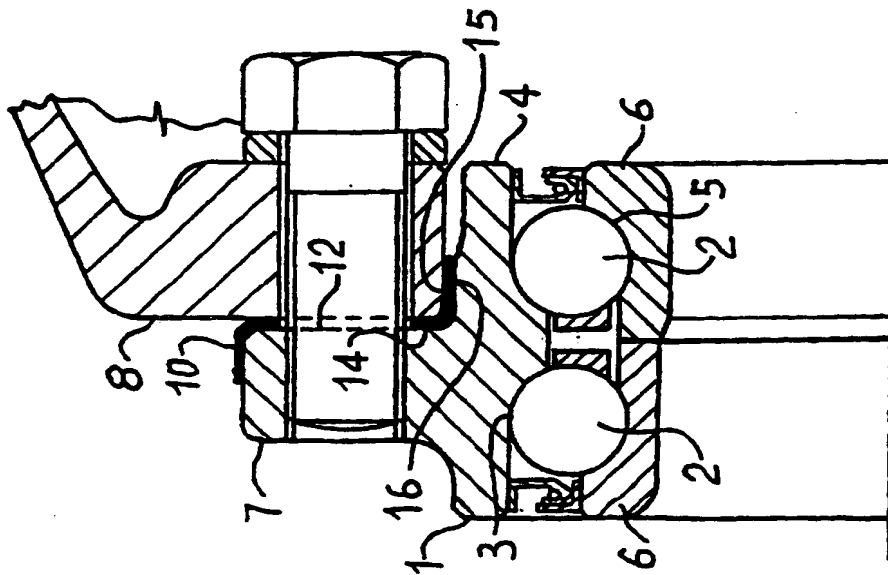
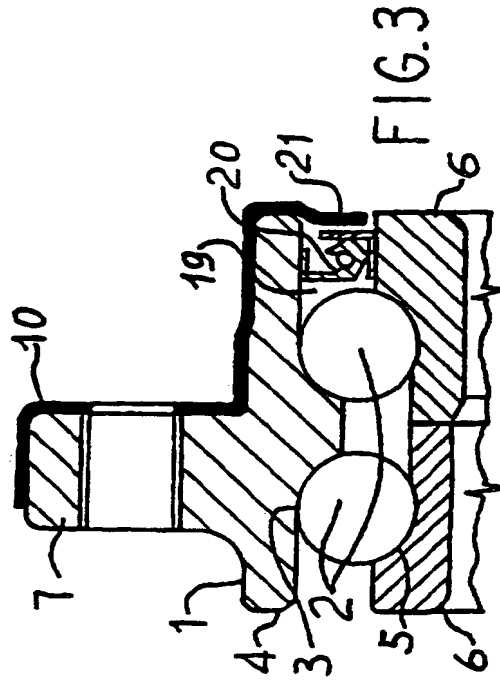
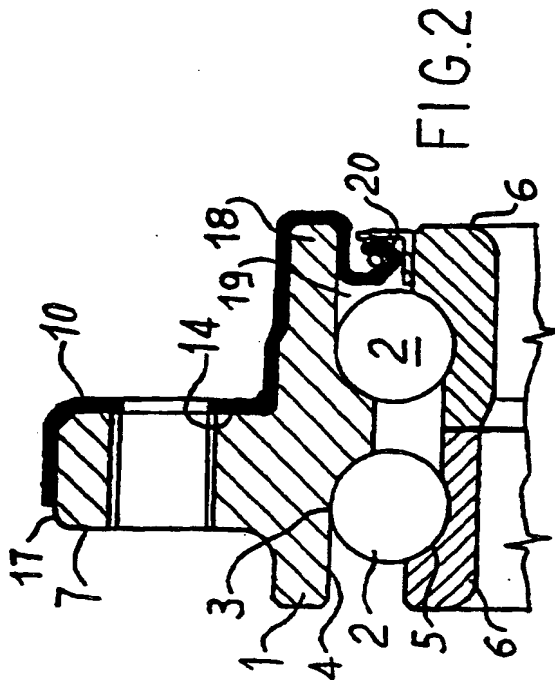
10

Claims

1. A corrosion-protective element for protecting junctions between metal parts (7, 8) against electrolytic corrosion, particularly for a coupling between a wheel bearing (1) of a motor vehicle and the corresponding strut (8), the bearing including a fixed outer ring (4) having an attachment flange (7) for connecting the bearing (1) to the strut (8), the protective element being characterised in that it is constituted by a shield (10) of sheet metal which is electrically passivated or at least has an anti-corrosive coating on opposite surfaces, shaped so as to fit closely over a contact surface of one of the metal parts (7) to keep the parts (7, 8) separated from each other. 15 20 25
2. A protective element according to Claim 1, characterised in that the contact surface comprises a radial face (14) of the flange (7) and a cylindrical face (16) of the ring (4) adjacent the radial face (14). 30
3. A protective element according to Claim 1 or Claim 2, characterised in that the shield (10) extends so as to cover an axially-facing edge (18) of the ring (4) and is connected to a sealing ring (20) of the bearing (1). 35
4. A protective element according to Claim 1 or Claim 2, characterised in that the shield (10) partly closes an annular axially-facing space (19) between the outer ring (4) and an inner ring (6) to form a labyrinthine seal for protecting the rolling bodies (5) of the bearing. 40 45

50

55



BEST AVAILABLE COPY



(11) **EP 0 800 011 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
08.07.1998 Bulletin 1998/28

(51) Int. Cl.⁶: **F16C 35/077, B60B 27/00**

(43) Date of publication A2:
08.10.1997 Bulletin 1997/41

(21) Application number: **97105057.0**

(22) Date of filing: **25.03.1997**

(84) Designated Contracting States:
DE FR GB SE

(30) Priority: **26.03.1996 IT TO960233**

(71) Applicant: **SKF INDUSTRIE S.p.A.**
I-10128 Torino (IT)

(72) Inventors:
 • **Vignotto, Angelo**
10100 Torino (IT)

• **Ruetter, Andreas**
10064 Pinerolo (IT)
 • **Pons, Luciano**
10064 Pinerolo (IT)

(74) Representative:
Plebani, Rinaldo et al
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(54) **Protective element against electrolytic corrosion, particularly for the strut of a vehicle and its bearing**

(57) In order to protect a junction between mechanical parts made from different metals from electrolytic corrosion, there is interposed between the parts a protective shield which is formed from sheet metal, generally steel, the surface of which is treated to render it electrically passive; more particularly, in the motor-vehicle field, the connection between the flange of a wheel bearing and the respective strut or between the flange and the end of a shock absorber or of a disc brake may be the seat of electrolytic corrosion; such corrosion is caused by electrovoltaic potentials generated in the zone of contact between different metals in the presence of moisture; the protective shield may also cover the side of the outer ring of the bearing and cooperate with the seal as an additional labyrinthine sealing element.

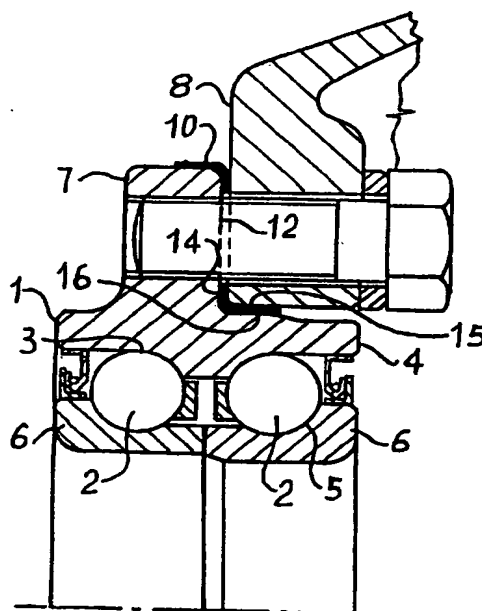


FIG. 1

EP 0 800 011 A3

BEST AVAILABLE COPY



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 10 5057

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	PATENT ABSTRACTS OF JAPAN vol. 14, no. 300 (M-0991), 28 June 1990 & JP 02 095901 A (NTN), 6 April 1990, * abstract *	1	F16C35/077 B60B27/00
A	EP 0 687 826 A (SKF) 20 December 1995 * the whole document *	1-3	
A	DE 16 05 082 A (KUGELFISCHER) 21 January 1971 * the whole document *	1	
A	US 5 454 628 A (MAIWORM) 3 October 1995 * the whole document *	1,2	
A	PATENT ABSTRACTS OF JAPAN vol. 96, no. 2, 29 February 1996 & JP 07 279972 A (NTN), 27 October 1995, * abstract *	1,2	
A	DE 24 27 688 A (KLÖCKNER) 18 December 1975 * the whole document *	1,2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F16C B60B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 May 1998	Examiner Orthlieb, C
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P4/C01)